Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Previously presented) A computed tomography method which comprises the steps of:

generating, using a radiation source, a conical radiation beam which traverses an examination zone or an object present therein,

generating a relative motion of the radiation source about the examination zone, which relative motion comprises a rotation about an axis of rotation and a displacement parallel to the axis of rotation and is shaped as a helix,

acquiring measuring values which are dependent on the intensity of the radiation beam that traverses the examination zone and is incident on a detector unit during the relative motions, and

reconstructing a CT image of the examination zone from the measuring values, in which reconstruction of an exact 3D back projection comprising the following steps is carried out:

determining the partial derivative of measuring values of parallel rays with different radiation source positions in conformity with the angular position of the radiation source,

performing a weighted integration of the partial derivative of the measuring values along K lines,

multiplying the integrated partial derivative of the measuring values by a first weighting factor which corresponds to the cosine of the cone angle of the ray associated with the measuring values and by a second weighting factor which corresponds to the reciprocal value of the cosine of a fan angle of the beam associated with the measuring values, and

reconstructing the absorption of each object point by back projection of the weighted, integrated partial derivative of the measuring values.

2. (Previously presented) The computed tomography method as claimed in claim 1, in which in the reconstruction step further includes rebinning of the weighted, integrated partial derivative of the measuring values is performed prior to the back projection so as to form a number of groups, each group comprising a plurality of planes which extend parallel to one another and to the axis of rotation and in which a respective fan beam is situated.

3. (Previously presented) A computed tomography method which comprises the steps of:

generating, using a radiation source, a conical radiation beam which traverses an examination zone or an object present therein;

generating a relative motion of the radiation source about the examination zone, which relative motion comprises a rotation about an axis of rotation and a displacement parallel to the axis of rotation and is shaped as a helix;

acquiring measuring values which are dependent on the intensity of the radiation beam that traverses the examination zone and is incident on a detector unit during the relative motions; and

reconstructing a CT image of the examination zone from the measuring values, in which reconstruction of an exact 3D back projection comprising the following steps is carried out:

determining the partial derivative of measuring values of parallel rays with different radiation source positions in conformity with the angular position of the radiation source;

performing a weighted-integration of the partial derivative of the measuring values along K lines;

multiplying the integrated partial derivative of the measuring values by a first weighting factor which corresponds to the cosine of the cone angle of the ray associated with the measuring values and by a second weighting factor which corresponds to the reciprocal value of the cosine of a fan angle of the beam associated with the measuring values; and

reconstructing the absorption of each object point by back projection of the weighted, integrated partial derivative of the measuring values,

wherein the weighted-integration of the measuring values along the K lines comprises the following steps:

determining a K plane for each radiation source position and each location to be reconstructed in the examination zone,

determining the K lines, wherein the K lines are lines of intersection between the K planes and a detector surface of the detector unit,

multiplying the partial derivative of the measuring values on each K line by a weighting factor which corresponds to the reciprocal value of the sine of a K angle, and

integrating the partial derivative of the measuring values along the K lines.

4. (Currently amended) A computer tomograph, comprising:

a radiation source and a diaphragm arrangement which is situated between the examination zone and the radiation source in order to generate a radiation beam which traverses an examination zone or an object present therein,

a detector unit which is coupled to the radiation source,

a drive arrangement which serves to displace an object present in the examination zone and the radiation source relative to one another about an axis of rotation and/or parallel to the axis of rotation,

a reconstruction unit configured to reconstruct the spatial distribution of the absorption within the examination zone from measuring values acquired by the detector unit,

a control unit configured to control the radiation source, the detector unit, the drive arrangement and the reconstruction unit in conformity with the steps of,

determining the partial derivative of measuring values of parallel rays with different radiation source positions in conformity with the angular position of the radiation source,

performing a weighted-integration of the derived measuring values along K lines,

multiplying the integrated, derived measuring values by a first weighting factor which corresponds to the cosine of the cone angle of the ray associated with the measuring values and by a second weighting factor which corresponds to the reciprocal value of the cosine of a fan angle of the beam associated with the measuring values, and

reconstructing the absorption of each object point by back projection of the weighted, integrated partial derivative of the measuring values.

5. (Previously presented) A computer-readable medium encoded with a computer program for a control unit for controlling a radiation source, a diaphragm arrangement, a detector unit, a drive arrangement and a reconstruction unit of a computer tomograph so as to execute the steps disclosed in claim 1.

6. (Previously presented) A method, comprising:

producing measuring values indicative of radiation that traverses an examination zone and is detected by a radiation sensitive detector; and

reconstructing the measuring values as a function of corresponding projection angles to generate an image indicative of the examination zone.

7. (Previously presented) The method of claim 6, wherein a projection angle is the angle enclosed by a PI line of an object point projected in a plane perpendicular to an axis of rotation.

8. (Previously presented) The method of claim 6, further including:

determining a partial derivative of the measuring values;

performing a weighted-integration of the partial derivative; and

reconstructing the integrated partial derivative to generate the image.

9. (Previously presented) The method of claim 8, wherein the partial derivative is integrated along K lines.

10. (Previously presented) The method of claim 8, wherein performing the weighted-integrating the partial derivative of the measuring values, includes:

determining a K plane for each radiation source position and each location to be reconstructed in the examination zone;

determining K lines, wherein K lines include lines of intersection between the K planes and a detector surface of the radiation sensitive detector;

multiplying the partial derivative of the measuring values on each K line by a weighting factor that corresponds to a reciprocal value of a sine of a K angle; and

integrating the partial derivative of the measuring values along the K lines.

11. (Previously presented) The method of claim 8, further including, prior to the reconstruction step, multiplying the integrated partial derivative by the same weighting factor.

12. (Previously presented) The method of claim 8, further including, prior to the reconstruction step:

multiplying the integrated partial derivative of the measuring values by the cosine of a cone angle of the radiation beam; and

dividing the integrated partial derivative of the measuring values by the cosine of a fan angle of the radiation beam.

13. (Currently amended) The method of claim 6, wherein reconstructing the measuring values includes reconstructing the measuring values as a function of the following:

$$-\frac{1}{2\pi^2}\int_0^{\pi} d\varphi \frac{\cos\lambda}{R\cos\varepsilon} p(y(s(\varphi)), \Phi(s(\varphi), x)),$$

wherein, $p(y(s(\varphi)), \Phi(s(\varphi), x))$ denotes a weighted integration of a partial derivative of the measuring values, $\frac{\cos\lambda}{R\cos\varepsilon}$ denotes a weighting factor, ~~and~~ $\int_0^{\pi} d\varphi$ denotes an integration over the projection angles φ <u>, λ denotes a cone angle of the radiation, ε denotes a fan angle of the radiation, *R* denotes a radius of a helical trajectory, *x* denotes a location in the examination zone, s(φ) denotes a parameter that is a function of φ, *y*(*s*) denotes a function that indicates a radiation source position along the helical trajectory and is dependent upon a parameter *s*, and Φ denotes a unity factor which points from the radiation source position *y*(*s*) in the direction of x</u>.

14. (Currently amended) The method of claim 6, wherein reconstructing the measuring values includes reconstructing the measuring values as a function of the following:

$$-\frac{1}{2\pi^2}\int_0^{\pi} d\varphi\, p(y(s(\varphi)), \Phi(s(\varphi), x)),$$

wherein, $p(y(s(\varphi)), \Phi(s(\varphi), x))$ denotes a weighted integration of a partial derivative of the measuring values, ~~and~~ $\int_0^{\pi} d\varphi$ denotes an integration over the projection angles φ, λ denotes a cone angle of the radiation, ε denotes a fan angle of the radiation, R denotes a radius of a helical trajectory, x denotes a location in the examination zone, $s(\varphi)$ denotes a parameter that is a function of φ, $y(s)$ denotes a function that indicates a radiation source position along the helical trajectory and is dependent upon a parameter s, and Φ denotes a unity factor which points from the radiation source position $y(s)$ in the direction of x.

15. (Previously presented) A method, comprising:

identifying a first voxel from a plurality of voxels within an examination zone to reconstruct; and

reconstructing the first voxel as a function of a first set of corresponding projection angles indicative of angles at which a radiation beam traverses the first voxel.

16. (Currently amended) The method of claim [[16]] 15, further including reconstructing at least a second voxel, from the plurality of voxels, as a function of a second set of corresponding projection angles indicative of angles at which the radiation beam traverses the second voxel.

17. (Previously presented) A system, comprising:

a detector that detects radiation from a conical radiation beam traversing an examination zone and that generates measuring values indicative of the detected radiation; and

a reconstructor that integrates the measuring values over projection angles corresponding to angles enclosed by a PI line of an object point projected in a plane perpendicular to an axis of rotation.

18. (Previously presented) The system of claim 17, wherein the reconstructor determines a partial derivative of the measuring values, performs a weighted integration of the partial derivative, and integrates the weighted-integration of the partial derivative of the measuring values.

19. (Previously presented) The system of claim 18, wherein the weighted integration, includes:

determining a K plane for each radiation source position and each location to be reconstructed in the examination zone;

determining lines of intersection between the K planes and a detector surface of the detector, wherein the lines of intersection are K lines;

multiplying the partial derivative of the measuring values on each line of intersection by a weighting factor that corresponds to a reciprocal value of a sine of a K angle; and

integrating the partial derivative of the measuring values along the lines of intersection.

20. (Currently amended) The system of claim [[17]] 1, ~~wherein the reconstructor back projects the measuring values using an exact 3D back-projection technique~~ further including multiplying the integrated partial derivative of the measuring values by a first weighting factor which corresponds to the cosine of the cone angle of the ray associated with the measuring values, a second weighting factor which corresponds to the reciprocal value of the cosine of a fan angle of the beam associated with the measuring values, and a third weighting factor which corresponds to an inverse of a radius of the helix.